

A CONTRIBUTION TOWARD THE NATURAL HISTORY OF RÖTHELN.

By REGINALD JOHN RYLE, M.A., M.B. Oxon.

In the chapter on Rötheln contained in his fine work on *Medicine*, the late Dr. Fagge urges the discrepancies of statement which occur, even in modern writings, "concerning the supposed third exanthem" as an argument against the view that the disease is distinct from measles. He points out that Trousseau insists on the absence of catarrh during the prodromal stage, while Thomas insists on its presence; that Thomas makes the duration of this stage (if not absent altogether) two to twelve hours, and Trousseau one to four days; that Trousseau and Vogel make the rash give rise to intense itching, while Thomas declares this to be seldom the case.

The following condensed record of two cases, in which, in spite of considerable differences in the symptoms, there could be no reasonable doubt that the patients were sufferers from the same disease, may be of interest as showing that the force of objections based on such discrepancies may easily be overrated.

CASE I.—On February 24th, I was called to see a young lady who had that afternoon found a rash upon her skin. There was a clear history of a previous attack of measles some years ago. Before February 24th, there had been no recent headache, sore-throat, or coryza. The patient had spent the day in sight-seeing, denied any sense of illness whatever, and was only anxious for medical advice from a fear that the rash "might mean something infectious." When first seen at 11 P.M., the rash referred to was found to be most abundantly developed over the prominent parts of the cheeks. The forehead was less thickly covered, and the region nearest the roots of the hair almost free from it. The rash consisted of small spots, distinctly raised, and with but little surrounding areola. They were nowhere confluent, of a pale rose colour, with the intervening skin generally clear, only somewhat flushed where spots were most abundant. There was no fulness about the eyelids, and a complete absence of the blotchy, puffy appearance of measles. The spots were very numerous about the neck and shoulders, and more thinly scattered about the arms. There was diffused redness of the soft palate and pillars of the fauces, and little or no enlargement of the tonsils. There was a slightly enlarged gland each side at the angle of the jaw. The glands in the posterior triangle and the suboccipital glands were enlarged on each side. The pulse was 80, and the temperature 99.4°. After two or three days, during which the temperature was normal, and no sign of ill-health showed itself, the patient began to experience some soreness of throat, together with a frequent hacking cough. These symptoms lasted a few days only. The glands in the neck became slightly tender, and then subsided, and in ten days from the appearance of the rash were no longer recognisable. No desquamation was seen at any time.

CASE II.—The elder sister of the above was said not to have had measles. On February 24th, this patient was living with her sister, and had, in fact, been sharing her bed. That night, however, she slept elsewhere, and next day left the house for a visit to some friends at a distance. On March 11th, she returned to her sister's lodgings. Both on this day and the next she felt unwell, and complained of slight sore-throat and headache. On March 14th, she noticed some lumps at the sides of the neck; and, on March 16th, a rash appeared on her face, which closely resembled the rash which her sister had had. On this day (March 14th), the temperature was 100°, and the tongue clean. Moreover, the patient had now no coryza, sore-throat, headache, or sense of illness. For the next five or six days there was some tenderness of the glands in the neck, a troublesome sense of itching and pricking in the skin, and a slight dry cough. The temperature generally was about 99°. At the end of this period, however, the temperature rose, the patient felt languid and chilly, the cough became incessant, though unaccompanied by any expectoration, and the throat became very sore. Thus, on March 24th, the palate, tonsils, and pillars of the fauces were bright red and swollen; the gums, also, were red, and the teeth tender to bite upon. The tongue was red at the tip, and much furred posteriorly. The patient could only swallow with difficulty, and complained of headache, sleeplessness, and pains all over. In addition to the chain of enlarged cervical glands and suboccipital glands, there was found to be an enlarged and somewhat tender gland in each axilla. Some desquamation was seen, for the first time, about the upper lip and sides of the nose; and, at the same time, a fresh rash was developed upon the neck, chest, and shoulders. This rash was a pale rose-coloured blush, distributed

in irregular patches, of varying shape and size, with smaller areas of normal skin here and there mixed with it. There were also soreness of the eyes and photophobia, but no reddening of the conjunctiva. The temperature was 102.4°. With the above symptoms, the case was not unlike one of scarlatina; but such a diagnosis would, of course, not have been compatible with the previous course of the illness, nor with the already present desquamation, nor, perhaps, with the comparatively low temperature accompanying the severe sore-throat. The condition of the throat was at its worst about March 24th, and by March 27th the severer symptoms were subsiding. The progress of the recovery was somewhat delayed by a slight attack of pleurisy on the right side, which first showed itself when the sore-throat was beginning to subside, and which occasioned a slight rise of temperature for some days after the fauces had resumed their normal state.

REMARKS.—It will be remarked that there was a history of previous measles in the first of these two cases, but not in the second. Accordingly, it may be suggested that the disease was, in reality, measles in both cases, and that the greater severity of the attack in the second case was due to the lack of protection by a previous infection. But to this view there are two objections. In the first place, all the most significant and characteristic features of measles were no less conspicuously absent from the unprotected second case than they were from the first, and the circumstances which made the illness a severe one in the second case were not among the more typical features of measles. In the second place, both cases—and the second no less than the first—had certain characters unlike those of measles. Thus, in each case, there was a rash which differed from that of measles in its colour, its local distribution, and other characters; in each case, the affection of the lymphatic glands was remarkable for (a) its early appearance (unconnected with the condition of the throat); (b) the site of the glands attacked, the suboccipital and glands of the posterior triangle being especially involved; (c) the symmetrical character of the glandular affection; and, in each case, the first substantial complaint of sore-throat came when the rash had almost gone.

In short, the clinical history of these two cases, in the main, resembles that which Dr. Tonge Smith gave in the *Lancet* for 1884, as representing his experience at the London Fever Hospital of 156 cases, which were diagnosed as cases of rötheln.

If then we may regard the cases as examples of rötheln, it is interesting to note the points in which their clinical histories differ, for they are among the "discrepancies" referred to in Dr. Fagge's criticism.

1. The first patient denied even the slightest malaise up to the time when the rash first appeared, while the second suffered from four or five days of "prodromal" illness, at the end of an incubation-period of about a fortnight.
2. The first experienced no sense of irritation of the skin, while the second made complaint of itching and pricking for several days after the rash first disappeared.
3. In the first case the sore-throat was of the mildest type, while in the second it resembled the sore-throat of a patient with scarlatina in its appearance and severity.
4. In the first case there was no noticeable desquamation, while in the second it was obvious enough to be noticed both by the patient and her friends.

ST. KILDA: ITS INHABITANTS AND THE DISEASES PECULIAR TO THEM.

By C. R. MACDONALD, M.D., Beith, Ayrshire.

SITUATED in the lonely expanse of the North Atlantic, about sixty miles west of Harris, is the small rocky island of St. Kilda. Until within the last few years, very little was generally known regarding the natives of this remote islet. Except when a smack went once or twice a year with the factor to collect the rents for the proprietor, Macleod of Macleod, of Skye, or when a yacht might on a rare occasion visit the island, the inhabitants had no communication with the outer world. For the last few summers, however, several trips were made to it by steamers from Glasgow, but, from its almost inaccessible nature no vessel ventures near it during the winter months. The only spot where a landing can be effected is in a small bay on the south-east of the island, but should the wind blow in this direction any boat attempting to reach the shore would be dashed to pieces on the rocks.

St. Kilda is between two and three miles in length, and about two miles at its broadest part. The highest point on the island is 1,220

feet above the level of the sea. With the exception of the bay mentioned, its rugged coast consists of lofty crags and gigantic cliffs, which form the home of countless numbers of wild fowl. These birds are of the greatest importance to the natives. The flesh and eggs of the fowl constitute their chief sustenance, while, with the feathers, they partly pay their rents, and barter for goods when the factor makes his annual visits. The birds which make these wild rocks their habitat are the fulmar petrel (*Fulmarus glacialis*), guillemot (*Uria troile*), razor-bill (*Chenalopes tora*), puffin (*Fratercula arctica*), and shag (*Graculus cristatus*). The latter is not used for food. Boreray an adjacent rocky islet, is crowded with solan geese, although there are none on the main island.

There are a number of land birds on St. Kilda, such as the starling, snipe, and others. All the rocks are igneous. The soil is light, and the natives burn dried turf for fuel. There is no system of drainage. There is no tree or shrub on the island, but the hillsides are covered with short grass on which sheep and a small-sized breed of cattle graze.

On patches of arable land, oats, barley, potatoes, and a few cabbages and turnips grow. The only other domestic animals are dogs and cats. Formerly, they had small ponies, but the breed has become extinct. To feed the enormous number of the winged tribes of this island, the supply of fish in the surrounding sea must be very abundant. The wingless bipeds, however, are not such successful fishers. Probably their boats are not sufficiently large for such a coast, and, besides, they have no means of trading with the outer world, so that the ling and cod they catch, except a few used by themselves, are salted and stored up for the factor. Like that of the Outer Hebrides, the climate of St. Kilda, though humid, is not cold in winter, and snow is seldom seen there; but, for a considerable part of the year, the island is frequently enshrouded in mists, and exposed to severe storms.

The population of St. Kilda is between seventy and eighty. There is no authentic account to enlighten us how or when it became inhabited. From the fact that even tradition is almost silent on this point, it must have been peopled at a very remote date. The natives are Celtic, and speak only the Gaelic language. With the exception of the scanty remarks by Dean Monro, who visited St. Kilda about 1549, the earliest reliable account we have of this island is by Martin, who visited it in the end of the seventeenth century. Martin appears to have been an educated native of one of the Western Isles, who devoted his time to Hebridean research. After visiting St. Kilda, he writes:

"The inhabitants are about two hundred in number, and are well proportioned. They speak the Irish language only; their habit is much like that used in the adjacent isles, but coarser. They are not subject to many diseases; they contract a cough as often as any strangers land or stay for any time among them, and it continues for some eight or ten days; they say the very infants on the breast are infected by it. The men are stronger than the inhabitants of the opposite western isles; they feed much on fowl, especially the solan geese, puffin, and fulmar, eating no salt with them. This is believed to be the cause of a leprosy that is broken out among them of late. One of them, that had become corpulent, and had his throat almost shut up, being advised by me to take salt with his meat, to exercise himself more in the fields than he had done of late, to forbear eating of fat fowl, and the fat pudding called "giben," and to eat sorrel, was very much concerned because all this was very disagreeable, and my advising him to eat sorrel was perfectly a surprise to him; but when I bid him consider how the fat fulmar eat this plant, he was at last disposed to take my advice, and by this means alone, in a few days after, his voice was much clearer, his appetite recovered, and he was in a fair way of recovery. Twelve of these lepers died the year after of this distemper, and were in the same condition with this man."

It is needless to say that Martin's advice regarding salt would be unnecessary at the present time, as the factor supplies them with that essential commodity. The pudding called "giben," to which Martin refers, is made with the fat of a young solan goose put into an old dried stomach of another fowl, with oatmeal, and boiled.

The leprosy here mentioned, of which there is now no trace on St. Kilda, was probably the lepra tuberculosa, identical with the leprosy of Iceland described by Sir Henry Holland, that of the Faroe and Shetland Islands described by Dr. Edmonston and others, and that still met with in Norway, where, according to the recent researches of M. Leloir, there are from 1,500 to 1,800 lepers. It is decreasing, however, as, in 1856, the number of lepers in Norway was 2,867. The disappearance of leprosy from the British Isles is generally supposed to be due to the drainage and greater cultivation of the soil.

This, however, would not account for its ceasing in St. Kilda. As to the cough contracted "as often as any strangers land or stay for any time among them," we shall notice further on.

The inhabitants all live in a village at the head of the bay on the south-east of the island, where they are well protected from the prevailing winds by a precipitous semicircular ridge of high hills, which forms, as it were, a huge wall all around them, except towards the bay, to which their houses face. The village consists of sixteen detached cottages in a straight row. Besides these, there are the church and manse, a house where the midwife resides, and another house, close to the shore, which is used by the factor as a store when he visits the island. These cottages are snugly built with stone and lime, and roofed with zinc. They were built upwards of twenty years ago by the proprietor. The previous dwellings were miserable-looking huts, the walls about five feet thick, built of loose stones packed with turf, and thatched with straw. Each house has two rooms, which are scantily furnished, while the walls do not appear to have been white-washed since they were built. With all their virtues, I must say that their houses are not models of cleanliness. The deposit of carbon from the peat-reek on the ceilings and walls is very considerable, while the epidermis of some of the old people I examined did not afford less proof of their being strangers to the use of the bath. From the situation of the houses, it is probable that they must be more or less damp in winter.

The food of the St. Kildians consists of the flesh and eggs of wild fowl, mutton, fish, potatoes, oatmeal-cakes, porridge, and milk. They likewise use tea and sugar. The women are extremely fond of sugar and sweets. The men have a keen relish for tobacco, especially that strong, coarse twist, a supply of which they expect from every stranger who visits the island; while the fair sex look as eagerly for their allotment of sweets. As for fruit, they seldom or never see any. There is an abundant supply of good spring water. The natives are very temperate in their habits; and, although they generally keep a little whiskey in their houses, drunkenness is entirely unknown among them. They are all well clad. From their own wool they spin and weave cloth. Except on Sundays and other rare occasions they never wear boots or shoes.

Since Martin visited St. Kilda the population has much decreased. We are told that, in 1730, an epidemic of small-pox broke out in the island, and left only between thirty and forty individuals, chiefly children. These increased to a population of eighty-eight in 1759. The infection of small-pox was brought from Harris. Since that time the population has been gradually decreasing. The chief cause of this is trismus neonatorum, which carries off the majority of the infants. The number of infants that die of this affection is variously stated; but, from what I could learn, fully 50 per cent. of the children born in the island die within a few days from their birth.

Many theories have been brought forward to account for trismus neonatorum. Impurity of the atmosphere has been pointed out as a cause. There is no doubt that in Ireland this appeared to have a connection with the disease, as manifested in the records of the Dublin Lying-in Hospital, where, in the beginning of the present century, the deaths from it were about 18 per cent. of the children born there. This condition of things immediately improved in a very marked degree when means were adopted for the efficient ventilation of the hospital, and in a few years the disease almost disappeared. Dirt, with defective ventilation, would likewise appear to be a cause of the disease in Iceland, and in other countries where it is common. These unsanitary conditions, however, do not altogether account for it in St. Kilda. In the first place, St. Kilda has been inhabited probably a thousand years—at any rate, several centuries. As Martin makes no reference to this affection when he visited St. Kilda in the end of the seventeenth century, we infer that it was unknown then; so that trismus has evidently been in St. Kilda not much over a hundred years.

We know that the sanitary condition of the people was not better when Martin visited them than it is at the present time. Before the present cottages were built, about twenty-five years ago, the old hut of the St. Kildian was quite a different dwelling. The only decent aperture in it was the door, through which an average-sized man could not pass without almost doubling himself. The fireplace was a flat stone in the middle of the floor, while a small hole in the middle of the roof permitted of the exit of an insignificant portion of the peat-reek. To complete this arrangement, the whole year's cattle-manure was collected in the hut in which they lived, until the floor rose several feet above its level. This was, no doubt, the state of matters when Martin visited the island, for he says: "Their beds are commonly made in the walls of their houses; and they lie on straw, but never on feathers or down, though they have them in greater plenty than

all the Western Isles besides. The reason for making their bedroom in the walls of their houses is to make room for their cows, which they take in during the winter and spring."

In the present houses, although there is still room for improvement, there are no cows kept, the doors and windows are sufficiently large to allow a constant interchange of the air within and without, and the smoke is conveyed out by chimneys. With all this progress in sanitary matters, the infant mortality is not decreasing. We may, therefore, conclude that the disease is not due to deficient ventilation, at least in St. Kilda. Another cause mentioned is filth irritating the wound left by the falling off of the funis, giving rise directly to septicæmia, or first producing inflammation of the umbilical vessels, resulting in blood-poisoning and trismus. It cannot be denied that this condition of the umbilical vessels has been noticed in some instances where the children died of convulsions; but, in the majority of cases in which phlebitis of the umbilical vein was found, death had resulted from other diseases. Dr. Mildner, of Prague, who recorded the results of forty-six cases of fatal inflammation of the umbilical vessels in children born in the lying-in hospital in that city, states that convulsions occurred only in five of the number (*West's Diseases of Infancy and Childhood*). As to the uncleanly habits of the St. Kildians, I do not believe they are worse than the greater number of the natives of the Outer Hebrides in this respect, and their dwellings are infinitely superior to many places we find in the slums of our large cities. We must, therefore, look for some other cause than the irritation of the navel by dirt to explain trismus in St. Kilda.

The late M. Parrot, of Paris, maintained that this disease was entirely due to changes in the urine, which were brought about by artificial feeding. Trismus, in his opinion, was a form of uræmic convulsions. In St. Kilda, the infants are not put to the breast for the first week, but cow's milk and water, with a little sugar, are administered till they are allowed to suck their mother. This cannot account for the disease, as we find infants are fed on the same principle in other places without any apparent bad results. Moreover, the mortality in the Dublin Hospital could not be due to artificial feeding, as the infants were all suckled by the mothers.

The late Dr. Marion Sims, in the *American Journal of the Medical Sciences*, in 1846, and further discussed in 1848, enunciated the theory that trismus nascentium was due to a displacement of the cranial bones. In the same Journal for January, 1884, Dr. Hartigan, of Washington, revives this doctrine, while he rejects all the theories that others have brought forward to explain the etiology of infantile trismus. He maintains that the true pathology is a malposition of the cranial bones, generally an inward displacement of the occipital bone. The displacement of the bones, he says, is normal at birth; but, when it continues for any length of time, it gives rise to this disease by its undue pressure upon the medulla oblongata and its nerves. While granting that these displacements may occasionally exist to such an extent as to give rise to trismus, yet the frequency with which the disease is met in some parts, while it is unknown in other places, would naturally lead us to seek some other explanation as to its causation.

I shall now briefly enumerate the various theories of the natives, and of others who visited St. Kilda, regarding this disease. The majority of the natives believe that the infantile lockjaw is a curse which hangs over St. Kilda; and, consequently, when an opportunity occurs, the mothers go to Harris to be confined. This, however, does not seem to afford much protection against the usual calamity. Some pious people suggest that it is a wise provision of Providence to prevent the overcrowding of the inhabitants upon a small island where the food-supply is limited; while some assert that it is caused by the mothers eating too much of the flesh of fat fowl. Others, including Mr. Sand, a gentleman who lived some months on the island and wrote an interesting small book on it, believe that the infants are killed by improper feeding. Lastly, it is the opinion of others that trismus results from the deteriorating effects of intermarrying for a long period.

Without pretending to know the pathology of this disease, I am of the opinion that to consanguinity we must look as the most likely predisposing cause of trismus in St. Kilda. After several centuries of intermarrying, we find that, in 1730, the inhabitants were nearly all cut off by small-pox. In less than other thirty years, this reduced community more than doubled itself. We then hear of the serious infant mortality for the first time, in a work published by Macaulay in 1764. It is true that the injurious results usually attributed to consanguineous marriages have not manifested themselves in St. Kilda. There are no cases of deaf-mutism; insanity and idiocy are unknown; and cases of imbecility have been extremely rare. Nay, the natives, considering their isolated condition, are a most intelligent

people. But we must not lose sight of the fact that the mental tension to which we are daily exposed is absent to the natives of St. Kilda. From year to year, life in this lonely isle maintains its constant, quiet, peaceful uniformity. It thus appears to me that the deteriorating effects of consanguinity have in St. Kilda assumed an unusual phase, predisposing the newly-born infants to a hyperæsthesia of the nerve-centres, which may be excited by deficient ventilation, dirt, improper feeding, or other cause. Why this condition should remain only during the first few days of the infant's life, we can no more explain than we can account for its existence. In other places—for example, in the Dublin Hospital before its unsanitary condition was rectified—deficient ventilation may only have been a secondary cause. Some remote cause may have predisposed the disease by those inmates of the lying-in hospital. The great mortality of the infants from lock-jaw in the small island of Westmannoe, off the coast of Iceland, is probably due to the same cause as in St. Kilda. Its frequency in hot climates has been attributed to sudden alternations of temperature, but to whatever degree this may constitute a factor of the disease in tropical climates, it certainly can have no influence in the causation of the disease in St. Kilda.

There is another disease which, in its mode of attack, is peculiar to the people of St. Kilda. The natives call it *cnatan-na-gall*, or strangers' cold. This is the cough to which Martin refers, and which has been vouched for by the Rev. Kenneth Macaulay, who was a missionary for some years on the island, and by every person who has resided for any length of time in St. Kilda, including the Rev. John Mackay, their present pastor and law-giver. When any stranger lands there, the natives almost immediately contract an affection of the nature of influenza. It appears that there is no difference whether the stranger has a cough or is free from any bronchial affection at the time. Like their ancestors, the present inhabitants fully believe in this mode of contagion of the "strangers' cold." Their faith in it goes so far that some of them allege they feel in the presence of strangers a sense of oppression about the chest. I fancy this must be more imaginary than real. Be that as it may, there is no doubt as to the sequence. The symptoms of this disease are, I am told, the following. Some of the natives, as I have mentioned, feel at once symptoms which are premonitory of the affection. As a rule, the invasion is sudden, but, in some cases, it is gradual. The patient complains of a feeling of tightness, oppression, or soreness in the chest; lassitude; in some cases pains in the back and limbs, with general discomfort and lowness of spirits. In severe cases there is marked fever, with great prostration. Sooner or later a cough sets in, which for the first day or two is dry; then clear viscid expectoration appears, getting soon muco-purulent. In a few days, these unpleasant symptoms usually disappear, except the cough, which in some cases lasts for weeks. In mild cases the patient merely suffers from a cough for a few days. The minister of St. Kilda, who has been eighteen years on the island, bears strong testimony to this "strangers' cold." He told me that it generally passes over all the natives, although he escapes, and occasionally a few of them are confined with it to bed for several days; but all the cases, as far as I could learn, terminate in recovery. The natives likewise believe that a boat from some parts, such as Glasgow or Liverpool, will bring a more severe form of the "cold" than one from the Hebrides.

Although they invariably suffer from this affection when the first boat goes to the island every year, or when there is a long interval between the arrival of boats, still they do not now all suffer when strangers go there within short periods. Mr. Sand, who resided in St. Kilda in 1875 and 1876, states that on the arrival of the factor's smack every one of the natives was seized with this affection; and the next strangers that landed on the island were a number of Austrian sailors from their wrecked vessel, when all the natives again suffered without exception. When I visited St. Kilda in June last year, I noticed that almost every person on the island was suffering from a cough. This cough, I was told, they contracted from a party on board a steamer which was there a few days previously. I examined the chest of a few of them, and I could hear the moist *râles* of bronchial catarrh in one or two of the worst cases. I asked the minister if he could in any way account for this affection. He told me that he had no doubt as to its cause. The air in St. Kilda, he said, was so pure, and as the natives were unaccustomed to inhale any impurities from their atmosphere, they were liable to be attacked in this way whenever people from other parts, where the air is more or less polluted, visited St. Kilda. Although works on germ-theories and micro-organisms have never figured in the St. Kilda minister's library, yet I do not think that his theory of the cause of this disease is far from being correct. It is very probable that the atmosphere in St. Kilda is free from a number of disease-causing organisms, which

are rife in other parts, where the inhabitants are more or less inured to them. In this way, it is possible that these agents of disease are innocuous unless a chill, damp, or other condition inimical to health predisposes the individual to their attack. Not so in St. Kilda. This inoculation of the inhabitants does not take place, consequently they suffer as a rule when they are exposed to their influence. Is it not also possible that consanguinity may be a factor in the predisposition of this disease as well as of the infantile affection?

As far as I could learn, there never has been a *bond fide* case of phthisis pulmonalis. Some people were said to have died of "cait-heabh," which, in their language, means a wasting; but, considering their ages and other circumstances, I am led to believe that chronic bronchitis was the cause of death, and not phthisis. As to the other diseases existing there, I can fully confirm what Dr. Acheson, R.N., of H.M.S. *Jackal*, states in his notes of a visit to St. Kilda, which appeared recently.

As no medical man has stayed longer on the island than during the short periods boats usually anchor in its somewhat unsafe bay, all our information regarding the trismus neonatorum and the "strangers' cold," must still be considered unsatisfactory. The accounts we have, however, of the diseases which are peculiar to the natives of St. Kilda, are sufficient to show that here is a field where scientific observations might throw much light on some obscure points in the etiology and pathology of disease; while, from an ethnological, as well as from a medical point of view, this small community, isolated for many centuries from the outer world, forms a subject for much interesting study.

SATURNINE GOUT, AND ITS DISTINGUISHING MARKS.

By G. LORIMER, M.A., M.D. EDIN., Buxton.

LEAD-IMPREGNATION is a predisposing cause of gout. In gout so caused, two morbid influences must be considered: 1. Lead-impregnation, with the blood-changes and cachexia which it induces; 2. Gout, with its complications and tendency to tissue-degeneration. It is proposed to inquire if their mixture affects the course of the latter, and confers upon it any special distinguishing characters.

It may be premised that, in the initial stages in some cases, no deviation from the appearances of ordinary gout is observed; that the course and character of the disease may be affected by the relative predominance of one or other morbid state; and further, that there is no one and special sign which marks saturnine gout as a distinct morbid entity. The appearances observed in the fully developed and more advanced stages are such as *a priori* might be expected to occur, but, taken in the aggregate, constitute a group of distinguishing marks.

The conclusions arrived at are based upon an analysis of 107 cases of gout due to plumbism, which have occurred in the writer's experience, and the subsequent remarks constitute a record of facts so observed.

Briefly to summarise, the distinctive marks are as follows.

1. *Age*.—The first attack of gout due to lead-impregnation occurs at an earlier age than when independent of it. Of 107 cases, the first attack occurred prior to 35 in 70 cases; and, in the remaining 37 cases, occurred for the first time between the ages of 35 and 65. This contrasts with the history of non-saturnine gout; for the first attack of the latter usually occurs from 35 to 40, while acquired gout is frequently a disease of later life.

2. *Hereditary Tendency*.—In saturnine gout, the influence of direct hereditary predisposition is less marked. Of 107 cases, it was noted in 9; and, even admitting that deductions drawn from negative proofs are only partially conclusive evidence of its absence, still, this percentage contrasts with non-saturnine gout, where hereditary predisposition is found to occur in at least 50 per cent. When hereditary tendency includes the arthritic group of diseases, the predisposition is increased from 9 to 30 per cent.

3. *Anæmia*.—In gout, the blood-corpuscles undergo no change in number and quality. The anæmia of saturnine gout results from the lead-cachexia, and is probably due to the action of lead on the blood. The red corpuscles are diminished in number, the white sometimes increased, and the red colouring matter is reduced. Anæmia was noted in 75 cases; in the remaining 32 cases, it was less marked or absent. The anæmia of saturnine gout not only contrasts with the sanguineous arthritic diathesis, but affects and modifies the type and progress of the disease.

4. *Asthenic Type of Arthritis*.—From the early age at which saturnine

gout occurs, when functional activity is more vigorous, asthenic and acute type of arthritis might be expected to prevail. In the early attacks in many cases, and in subsequent attacks in a minority of cases, the arthritis assumes this type; but, in the majority of cases, the type of arthritis is asthenic or adynamic. The local and constitutional phenomena are less intense, but more persistent, lingering, and obstinate, and show a tendency to pass insidiously into a chronic form. The asthenic type of arthritis appears due to impaired vital activity, resulting from the cachexia, and to organic renal changes which subsequently arise.

5. *Albuminuria*.—The experiments of Ollivier, denied by Rosenstein, but repeated with affirmative results by Charcot and Gumbolt, show that albuminuria occurs in lead-impregnation. On the other hand, Dr. Garrod has found that in gout, especially in its chronic form, albuminuria is present in 26.5 per cent. of cases. *A fortiori*, it follows that, in saturnine gout, albuminuria would occur more frequently. In the 107 cases, it was present in 89, either as an intermittent or permanent condition. In 18 cases it was not noted. In the early history it may be absent, in subsequent stages it may be intermittent, but it may be doubted whether it is ever entirely absent during the whole progress of the disease. A daily examination of the urine has, in the writer's experience, seldom failed to discover its presence, and there is no sign in saturnine gout more constant, certain, and characteristic. Further, the specific gravity of the urine is diminished, averaging 1012. The quantity of uric acid is decreased, and, in the final stages of the disease, is absent altogether.

6. *Arterial Thickening and Degeneration*.—This condition, noted in sixty-nine cases, consists of a sclerosis of the arterial coats, along with atheromatous changes. It is, in fact, a premature ageing of the arterial system. *a*. It may be due to the action of lead, which causes contraction of the muscular walls of the arteries, and raises arterial tension. *b*. It may be connected with the renal changes which arise in saturnine arthritis. *c*. It may depend on the condition of the blood in gout, which gives rise to increased arterial tension, and predisposes to atheroma. Cardiac hypertrophy is observed in saturnine gout, especially at the advanced period of the disease. The arterial changes, however, may occur independently of the cardiac. Pericarditis has been noted by Charcot and Gumbolt. One instance only was noted by the writer in the cases referred to.

7. *Cutaneous manifestations* of gout are seldom present in saturnine arthritis. Of 107 cases, one was associated with psoriasis and one with eczema, and in the latter instance there was a hereditary history of gout, contrasting with non-saturnine gout, where eczema occurs in 18 per cent. of cases.

The blue line upon the gums, due to formation of lead-sulphide, was noted in eighty-seven cases. It is a sign which may indicate the cause of the gouty phenomena.

Gouty affections of the eyes were of infrequent occurrence. One case of iritis was noted. Exception, however, may be made to neuro-retinitis, in the causation of which gout and plumbism appear both to participate.

Joints affected in Saturnine Gout.—In twenty-eight cases, the joints of the feet were involved, in seven of which the great toe only was implicated. In twenty cases, the joints of the hands. In thirty-four cases, the joints of the hands and feet were both affected. In the remaining twenty-five, the knees also were implicated, in four of which the elbows also were affected. In twenty-three cases, tophaceous deposits were noted on the helix of the ear. Gout associated with lead-impregnation, however, seems to attack the kidneys. Gout associated with alcoholic excess generally attacks the joints. Lancereaux has observed that, in saturnine gout, uratic deposits are less abundant, and with this opinion the writer's experience is in some measure in harmony. It is, however, a question of degree, not of kind. Their presence is conclusive evidence of gout.

The experience of some observers is that rheumatism, and not gout, is associated with plumbism, and the difference is ascribed to the absence of previous habits of alcoholic intemperance. The explanation is incomplete. Gout may supersede rheumatism. The writer has observed more than one instance in which the question of alcoholic intemperance might be dismissed, where plumbism was originally associated with rheumatism, and in which uratic deposits occurring twelve years subsequently, showed unequivocally the gouty character of the disease. Such cases seem to lend some countenance to the doctrine of a "basic arthritic diathesis," out of which are evolved, under special causes, the several arthritic diseases.

How far saturnine gout may be due to the action of lead on the pneumogastric nerves, leading to imperfect metabolism, and on the trophic centres of the joints in the spinal cord, are subjects at present in the region of conjecture.